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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR NOVEMBER 1938

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FREDERICK HARRIG TUCKER

Frederick Harrig Tucker, chemist in the Division of Cotton Insect Investigations, died on November 22, 1938, at Starkville, Miss., from complications following pneumonia. Interment was at Leesburg, Va. His wife, Viola Virginia Tucker, and a son, Frederick Jr., a senior at the Naval Academy; survive him.

Mr. Tucker was born in Madisonville, Ky., on June 29, 1879. He received his B. S. degree in chemistry from the University of Kentucky in 1909. He had wide experience in inorganic chemistry and chemical engineering, having served with the soil and drug laboratory of the Kentucky Experiment Station while a student; with the technological branch of the Geological Survey in analyzing cements and alloys used in the construction of the Panama Canal, 1909-10; with the Bureau of Standards as research and analytical chemist on iron, steel, and alloys, 1910-20; with a mining company on research on ores containing copper, lead, zinc, and other metals, 1921; and with the Bureau of Public Roads on methods and apparatus for testing bituminous road materials, 1921-24. He came to the Bureau of Entomology in 1924 and was stationed at the Tallulah, La., laboratory until transferred to State College, Miss., in 1933. His work relating to cotton insects consisted of chemical and physical testing of calcium arsenate and other insecticides used for boll weevil control; their distribution and effective doses when applied by airplanes; and, in later years, research on the effect of arsenicals on soils and crops.

FRUIT INSECT INVESTIGATIONS

Nicotine spray for codling moth control may save growers money.--Nicotine sulphate used in place of lead arsenate for controlling the codling moth may actually reduce the cost of producing apples in the Pacific Northwest instead of increasing it, as has been commonly believed. Figures based on actual costs in a number of orchards where spraying was done experimentally or by growers have been compiled by E. J. Newcomer, of the Yakima, Wash., laboratory. At current prices for apples, and using the picked box with culls out as a basis, there may be a net saving of several cents a box. The development of the nicotine-bentonite formula has made this possible. In experimental orchards the additional cost of nicotine, used with bentonite or mineral oil, over the cost of lead arsenate has been 7½ cents per box. This might have been 12 cents per box with a light crop, but some growers have used the nicotine program at an additional cost of only 3 or 4 cents per box. The apples had an increased value of 4 cents per box because they had 20 percent less stings than apples sprayed with lead arsenate. This increase might average 3 cents. The apples also were more highly colored, giving them an additional value of 2 cents per box. Apples sprayed with nicotine can be packed without washing, and they may or may not require wiping. The latter cost is 2 cents per box, the former 6 cents, hence the saving here is either 4 or 6 cents per box. When the arsenic tolerance made washing necessary, most growers had to have their fruit packed at central plants, as they could not afford to buy the washing machinery. With a nicotine program, however, growers can again pack their own fruit at a saving, by their own estimate, of 3 to 5 cents per box. Striking an average of these figures, there should be a saving of 3 cents on account of stings, 1 cent on account of color, 5 cents on account of cleaning, and 4 cents on account of packing, or a total average saving of 13 cents per box. The minimum would be 8 cents and the maximum 17 cents per box. Comparing these figures with the additional cost for nicotine of 3 to 12 cents per box, an average net saving of 5 cents per box could be realized. In the above figures, no account was taken of savings in the control of red spiders, aphids, and leaf hoppers, or of depreciation in fruit caused by the washing treatment.

Derris and cube of little value as stomach poisons against Japanese beetle.--W. E. Fleming and E. D. Burgess, of the Japanese beetle laboratory at Moorostown, N. J., have reported on tests conducted during the summer of 1938 with various materials as stomach poisons against Japanese beetles. Comparative tests were made with derris and cube having the same rotenone content (4 percent) and practically the same percentage of total extractives (14 and 16 percent, respectively). Neither material appeared to have any appreciable value as a stomach poison. Derris, however, has a high rating as a repellent to the beetle, and the tests indicated that for repellent purposes, either cube or timbo could be substituted for derris, provided the rotenone content of the materials was about 4 percent and the total extractives about 16 percent.

Propagation of imported dipterous parasite of Japanese beetle.--J. L. King and L. B. Parker, of the Moorestown laboratory, have reported on propagation of Dexia ventralis Ald. during 1938. Between 1926 and 1936, liberations of this species were made at 13 points in New Jersey, Pennsylvania, Maryland, Long Island, N. Y., and Illinois. Of these, only one colony is known to have survived--the colony at Haddonfield, N. J. In order to insure availability of material for further releases as the Japanese beetle spreads into areas varying in climatic and other conditions, laboratory propagation of field-collected Dexia females was carried on this season. Only seven first-brood Dexia females were collected at the Haddonfield colony between June 8 and July 8, 1938. From this original stock, material was reared through successive broods so that it was possible to release 162 males and 95 females of the third-brood adults at Haddonfield to strengthen the colony there, and also release 302 males and 224 females at a selected site at Marple, Pa., in an effort to establish a new colony; the balance of the third-brood material is being carried over in hibernation at the laboratory as parasitized host larvae for spring colonization.

Flight habits of Ahasverus advena (Waltl).--This small beetle, known as the foreign grain beetle, occurs in relatively small numbers in stored raisins. It was present in a sample of 45½ pounds of raisins collected on June 24, 1938, at the rate of 1,088 per ton. Short-interval collections from a rotary net operated in a raisin storage yard by Dwight F. Barnes and George H. Kaloostian, of the Fresno, Calif., laboratory, showed that the species is on the wing most abundantly in the evening. The following record shows the evening flight on May 13.

Time (p.m.)[1]	Temperature	Relative humidity	Light	*A. advena* taken
	°F.	Percent	Foot candles	Number
6:45	91	35	100.00	4
7:00	90	36	45.00	26
7:15	88	40	11.00	88
7:30	88	40	1.00	62
7:45	87	40	0.25	38
8:00	85	44	0	26
8:15	85	44	0	11
8:30	85	44	0	14
8:45	85	44	0	11
9:00	85	41	0	1

[1] Sunset was at 6:58.

The catches recorded during the season were as follows: April (14-30), 1,520; May, 9,663; June, 2,983; July, 2,915; August 1,110; September, 1,238; October, 624.

Insect survey in peach orchards.--In the period from May 21, 1936, to November 1, 1938, the mobile laboratory unit No. 1, W. F. Turner, in charge, with headquarters at Little Rock, Ark., covered a total of 42,373 miles in the survey of insects that occur in peach orchards. The travel extended west from the Carolinas through Georgia, Alabama, and Mississippi to western Texas; north through Arkansas, Tennessee, Missouri, Illinois, and Indiana, into Michigan; and east through Kentucky, West Virginia, Virginia, and Pennsylvania to the Eastern Shore of Maryland. Collections have been made in peach orchards in 17 States, both where the phony disease is known to spread naturally and where the disease does not occur or, if it has been reported, there is no evidence of natural spread. Fifteen localities in 12 of the Southeastern and Middle Western States have been visited regularly and in each of these localities 2 collection stations have been established. A total of 87 visits have been made to the regular collection localities, or an average of 5.8 visits to each collection station. Twenty-four visits were made to 16 supplemental collection localities in 5 States where 69 definite collection stations were designated for the survey and for future comparative collections, an average of 1.5 visits to each supplemental station. At the 31 localities in the 17 States, representing 99 collection stations, a total of 644 collections were made, yielding 15,298 accessions, representing up to October 15, 1938, 1,309 species that have been named by the Division of Insect Identification.

MEXICAN FRUITFLY CONTROL

No Mexican fruitflies trapped in November.--Ordinarily some Mexican fruitflies are trapped in the lower Rio Grande Valley in November, but this season is an exception. Of the approximately 38,000 trap inspections made during the month, not a single adult *Anastrepha ludens* Loew was taken. Several other *Anastrepha* species were in the area, however. Traps took *A. serpentina* Wied., *A. mombin-praeoptins* Sein, *A.* species "Y", one unidentified new species, and many specimens of *A. pallens* Coq. Grove inspections likewise gave negative results so far as *A. ludens* was concerned. Extremely dry weather continues to delay the development of the present citrus crop, although irrigation is being resorted to.

CEREAL AND FORAGE INSECT INVESTIGATIONS

White-fringed beetle shows decrease in Florala, Ala., area.--According to H. C. Young, on November 24, 1938, the annual fall survey in the Florala area showed the larval population of *Naupactus leucoloma* Boh. to be much reduced, as compared with that recorded in November 1937. The average population of grubs per square yard, as recorded in cotton, corn, and peanuts in 1937, was 184, whereas in 1938 this had become reduced to 90 per square yard. A high population recorded in fields of early corn in 1938 was believed to have been induced by a heavy growth of cocklebur in such fields.

Naupactus n. sp. in Gulfport, Ala., area has long emergence period.--According to Mr. Young, the emergence of *Naupactus* n. sp., a form closely related to the white-fringed beetle, in cages placed in infested fields continued throughout a period of almost 5 months. First emergence was observed on May 22 and adults were still emerging on October 10. The greatest amount of emergence occurred between June 21 and August 9, when more than 80 percent of the total was recorded. Apparently this species deposits a considerably smaller number of eggs than does *N. leucoloma*.

Variation in viscosity of oils unimportant in control of Heliothis obsoleta F. in ear corn.--According to results reported by G. W. Barber in his work with the injection of mineral oils into the tips of ears of sweet corn for protection against the ear worm, there was no important difference in the efficiency of oils varying rather widely in viscosity. The oils used were purchased in the open market and were produced by two different manufacturers. Their viscosity ranged from 125-135 to 335-345, Saybolt test, and they were of the quality ordinarily used for internal medication. In view of the greater fluidity of the oils of lower viscosity, it seemed apparent that they could be used to advantage because they would flow more readily through the long spout and small aperture of the injection apparatus.

JAPANESE BEETLE CONTROL

Evergreen-bough inspection nets 829 egg clusters.--The record egg cluster removal in connection with this season's inspection of evergreen-bough material shipped from the New England area was 500 egg clusters found on 5 tons of evergreen boughs inspected at Cape Porpoise, Maine. Two hundred egg clusters were taken from a ton of boughs examined at Freeport, Maine.

Approximately 100 egg masses were found on 2½ tons of boughs inspected at Pownal, Maine. At Shapleigh, Maine, 25 egg clusters were found on 5 tons of boughs. Two egg clusters each were found on bough material inspected at Bath, Maine, and Topsfield, Mass. The boughs inspected at Cape Porpoise, Freeport, and Shapleigh were used in the manufacture of Christmas wreaths for later sale to customers outside of the regulated area. After manufacture from the inspected boughs, the wreaths were sealed for ready identification when they are presented for certification to nonregulated territory.

Egg clusters destroyed during forest-product inspections.--During the month, 27 egg clusters were removed from 5 carloads of lumber inspected at Danbury, N. H., preparatory to transportation to New Haven, Conn. Inspection of 2 carloads of lumber at Deering Junction, Maine, going to Camden, N. J., netted 11 egg masses. Another inspection of a single carload of lumber at Deering Junction yielded six egg clusters on material going to Buffalo, N. Y. Six egg clusters were removed from a carload of paving blocks inspected at Suncook, N. H., for shipment to Troy, N. Y. A small shipment of nursery stock also disclosed two egg clusters when inspected at South Windham, Maine, for shipment to Evansville, Ind. Eight additional egg clusters were taken from miscellaneous shipments of logs and lumber. Inspection of 1,500 1-foot birch logs at Boston resulted in the removal of 4 egg clusters. These logs are novelty containers for ultimate consignment to nonregulated points.

Christmas-tree inspection delayed.--Inspection of Christmas trees in the lightly infested gypsy moth area was considerably delayed, owing to the warm weather prior to November 25. It was too warm to haul out of the woods the trees that had been cut, since they would lose their leaves when assembled for inspection. In Maine, crews engaged in cutting Christmas trees abandoned the woods because of the presence of swarms of mosquitoes. When cold weather finally arrived on November 24, it was accompanied by a heavy fall of snow. Twenty temporary inspectors were employed for the period of Christmas-tree and greenery inspection.

Fox-farm buildings carry gypsy moth infestation.--Information was furnished by A. F. Burgess, of the Division of Gypsy Moth and Brown-tail Moth Control, that a crew of gypsy moth scouts had located 155 old egg clusters and 83 new masses on kennels, runs, lumber, and other equipment of a fox farm which had recently moved from Dover, Mass., in the generally infested area, to Cummington, Mass., in a lightly infested section.

Scouting of permitted nurseries completed.--Surveys for gypsy moth infestation in nurseries in the Manchester, Conn., area allowed to ship under gypsy moth permit were finished in November.

Complete inspection of evergreen boughs.--Most of the inspection of evergreen-bough lots in western Massachusetts and southern Vermont was completed by mid-November. Baled boughs were then certified for shipment into the States of New York, Ohio, and Missouri. Several gypsy moth egg clusters were located on the bough lots. Cutters avoided the sections in which these infestations were found.

Recent confirmations of infected elms.--Early in November a laboratory report was received confirming the first Dutch elm disease infected tree to be found in Newton Township, Fairfield County, Conn. This tree was first reported by an autogiro scout. This infection resulted in an extension of 75.91 square miles in the infected zone in Fairfield County and the addition of 50.84 square miles in the New Haven County protective zone. Re-collection of twig samples from an elm originally tagged in September resulted in reconfirmation of a tree in Howell Township, Monmouth County, N. J. This confirmation places Howell Township and the Borough of Farmingdale within the infected zone and adds 63.70 square miles to that area. Another tree, confirmed in the town of Stanford, Dutchess County, N. Y., is located approximately 5 miles east of the nearest diseased tree and is 6½ miles south of the Columbia County line, 12 miles west of the Connecticut line, and 15 miles southeast of the Massachusetts-New York State line. The latter elm was a girdled tree, heavily infested with bark beetles, many of which had already emerged. Notice was received from the laboratory on November 10 of the confirmation of a tree located in Upper Makefield Township, Bucks County, Pa. This makes a total of 10 trees confirmed in Pennsylvania. The first 1938 confirmation in the Cumberland, Md.-Wiley Ford, W. Va. area was received in mid-November. This was a twin tree with two 10-inch leaders, located in woodland in the vicinity of a previously confirmed tree, 5 feet from the Potomac River at Wiley Ford, W. Va. Confirmation of an elm in Hamptonburgh Township, Orange County, N. Y., increased the New York work area to 3,955 square miles. Another New York confirmation involved a tree in the township of LaGrange, Dutchess County. A diseased tree reported from Hamilton County, Ind., late in the month is about 1,200 feet from the only other confirmed tree in that county. When removed as a dead and dying tree, a sample was taken from the roots. This was later cultured as Graphium.

Autogiro activities.--Regular autogiro operations on Dutch elm disease scouting were concluded on October 19. Other activities have occupied the autogiro unit since that date. On October 26, giro NC-2740 cleared the USDA airport at Preakness, N. J., en route to Keene, N. H., to engage in a cooperative survey to map and estimate the storm damage to elm and white pine in that vicinity. En route to Keene, this ship was flown along a route west of the Connecticut River north from Waterbury, Conn., to South Londonderry, Vt. Small groups of damaged elms were observed. From Londonderry, Vt., scouting was continued in a southeasterly direction to Keene. No storm damage was apparent in the vicinity of Keene, although the elms in Keene were severely damaged. While en route from Keene to the home airport, another strip west of the Connecticut River was scouted from Brattleboro, Vt., to Waterbury, Conn. Very little storm damage was observed. During November the same autogiro assisted in a timber-damage survey conducted in the vicinity of Concord and Keene, N. H., by the New Hampshire State Fire Hazard and Timber Salvage Commission. Up to December 3, the crew of the large ship had completed approximately 2,000 square miles of territory on the survey. One of the smaller autogiros, NC-12684, also assisted in this survey, first operating from Keene until deep snow there forced a transfer to the Concord airport. Late in the month, plans were made to dispatch autogiro NC-13189 to Brownsville, Tex., to engage in autogiro scouting for the Division of Pink Bollworm and Thurberia Weevil Control.

Bark-beetle survey.--A survey for hibernating *Hylurgopinus rufipes* Eich. was concluded in the Cumberland, Md.-Wiley Ford, W. Va., area on November 18. Most of the beetles found and submitted to the laboratory for culturing were collected within from 6 inches to 3 feet of the ground. A plot located 1 mile southeast of a trap log, in which beetles of this species were found to be carrying the disease fungus, was checked for hibernating tunnels, galleries, and beetles. *Scolytus multistriatus* Marsh. is not abundant in this area. Galleries of this species found in the course of the work were submitted to the laboratory along with those of *H. rufipes*.

Certification activities.--Nursery activities throughout the Japanese beetle regulated area were quite spotty during the month. Movements of stock were quite light in the New York City area, notwithstanding the fact that the fall shipping season continued until Thanksgiving. Occasional shipments were certified, but most of the business was local and a good part of that was centralized on the New York World's Fair grounds.

No bidders for classified nursery.--Plant material growing in a greenhouse range of 6,500 square feet, comprising 14 houses, was offered at public auction at Mt. Washington, Baltimore, Md., on November 4. Although the sale was attended by hundreds of nurserymen and greenhousemen from Maryland, Delaware, Pennsylvania, Virginia, and the District of Columbia, not a single bid was received. Failing to dispose of the stock, the establishment is being permitted to remain in operation under Federal regulation, the Government, having been the mortgagee, ordering the auction.

Post-season Japanese beetle adult finds.--An inspector brought in a live male Japanese beetle on November 8, collected on zinnia at Rumson, N. J. Another "last" beetle was found November 7 on a rose growing in a yard in Swarthmore, Pa.

Radio quips.--Following a tune on a compressed air sprayer by one of the amateurs on Major Bowes hour, the Major exclaimed, "Bring that out to my house next July and spray for Japanese beetles." Ben Bernie, in his November 13 broadcast, remarked about the Japanese beetles eating the crops on his farm in Floirda--but in this instance his locale was mixed.

FOREST INSECT INVESTIGATIONS

Scale insects cause extensive damage to young pines.--In examining the condition of young ponderosa pine stands on the Malheur National Forest in Oregon, Junior Foresters Kachin and Welsh recently discovered an area of over 400 acres with overstocked 30- to 60-year-old ponderosa pine which was so badly injured by some insect or disease that no crop trees could be found. The main leaders and laterals were badly deformed, and the twigs showed cankerlike swellings. The needles were pale and short and many tips were killed. It was obvious that the injury had been progressing for several decades. Examination of the galled twigs, by F. P. Keen, of the Portland, Oreg., laboratory, disclosed the presence of numerous scale insects, apparently a species of *Matsucoccus*. This is the first case that has come to the laboratory's attention in the Pacific Northwest of extensive and serious forest damage resulting from the work of this genus.

Western pine beetle infestation declines.--All early reports from the regional pine beetle survey conducted in July, August, and September showed a marked increase in the summer generation of western pine beetle throughout the ponderosa pine forests of Oregon and Washington, according to Mr. Keen. Notwithstanding higher precipitation and better tree growth, timber losses were increasing everywhere. The situation was both alarming and disconcerting because it was obviously impossible to apply control measures throughout the entire ponderosa pine region in one season. Fortunately, late cruises in October and November showed that a sharp drop in infestation had occurred between the summer and winter generations. Similar breaks in infestation occurred in 1923 and 1928, also outstanding years of good tree growth. Evidently, increased tree resistance does not make itself felt until late in the season.

Hemlock looper flight reported.--Mr. Keen also reports that the hemlock looper, a serious defoliator of western hemlocks, has again been noted in abundance in the State of Washington. On September 29 district ranger D. J. Stoner observed a large number of moths in flight along the South Fork of the Stilaguamish River. No defoliation was observed. Approximately 10 years ago the last outbreak occurred in this vicinity, so this may be just the beginning of another epidemic, as these insects seem to come in 10-year cycles.

Extremely low temperatures fail to destroy mountain pine beetle larvae.--Tests relative to the development of cold-hardiness, or the resistance of mountain pine beetle larvae to low temperatures, are again being conducted at the forest-insect laboratory at Coeur d'Alene, Idaho. As the low-temperature equipment did not provide temperatures sufficiently low to produce larval mortality when full cold-hardiness had been developed, dry ice was added to the cabinet to increase its efficiency. This method provided a temperature of 40° below zero. However, mountain pine beetle larvae from white pine, after being exposed to this temperature for 2 hours and 15 minutes, failed to show any mortality that could be credited to the low temperatures. Although there was a 10-percent mortality, the lack of resistance of these few larvae apparently resulted from injuries received while being removed from the logs.

Forest insect surveys, Clearwater and Kootenai National Forests.--J. C. Evenden, Coeur d'Alene, reports the completion of forest-insect surveys on the Clearwater National Forest and adjacent private holdings, and on the Kootenai National Forest, in Idaho and Montana. Although in these two areas there is an infestation of the mountain pine beetle distributed throughout all of the white pine stands, for the most part it is not above that which is considered as a normal condition. However, in both forests there are several so-called "hot spots" of infestation that will require treatment in the spring of 1939. The treatment of the infested trees on these areas will require approximately $35,000. Of this amount, $25,000 will be spent on the Clearwater National Forest and $10,000 on the Kootenai National Forest.

Barkbeetle control project on Medicine Bow National Forest completed.--According to J. A. Beal, Fort Collins, Colo., control work by the Forest Service against the Black Hills beetle (Dendroctonus ponderosae Hopk.) on the Medicine Bow National Forest, in southern Wyoming, has been practically completed. Only about 1,200 infested trees were spotted and treated this year as against more than 12,700 trees on the same area last year. This is a reduction of slightly over 90 percent in the infestation from last year and is a remarkably good record of control. Some 300 infested trees were also treated on a portion of the Hayden Division of the forest, in an area not covered by treating last season. During this year's work it was found that there was practically no reinfestation of the forest from the heavily infested Elk Mountain area, which is situated not more than 5 miles from the north boundary of the Medicine Bow National Forest.

Apparent rise in Black Hills beetle infestation in southern Utah.--Donald De Leon, Fort Collins, reports a puzzling situation in connection with the Black Hills beetle outbreak at Bryce Canyon National Park, Utah. With 2 years of control work on the entire infested area and a reduction of 60 percent in the number of infested trees after the first year of control, it has been found that the number of infested trees the past season has increased. Although at first glance it looks like an increase in the beetle population, there actually appears to have been a reduction, for the beetles the past season have concentrated on much smaller trees than in previous years and the attacks appear to be lighter. A similar situation prevails on parts of the adjacent Powell National Forest where control work has likewise been done in the past 2 years. It will be interesting to follow up this infestation next fall to find out what actually has happened in this area.

Matsucoccus scale causes severe injury to pines in Pennsylvania.--T. J. Parr, of the New Haven, Conn., laboratory, reports that the first week in November was spent in recording data on condition of trees in the *Matsucoccus* plots at Mont Alto and Mount Union, Pa. In one sample plot in a 19-year-old pitch pine plantation at Mont Alto, 43 percent of all the trees in the plot lost their leaders this year. Of the 23 dominants on the plot, 3, or 13 percent, had leaders killed; 57.5 percent of the codominants had leaders killed back this year, as did 50 percent of the intermediates and 37.5 percent of those classed as suppressed. In the same plantation there is evidence, from crooked trunks, that the insect has been active in killing leaders on trees in all crown classes for at least 8 years. In another plot, in natural reproduction of short leaf pine at Mont Alto, 63.6 percent of the trees attacked by the insect this year had leaders killed. Data from a very heavily infested pitch pine plot near Mount Union, show that 74.2 percent of the trees lost leaders this year. This plot is so heavily infested that the trees have practically ceased to grow. Many of them have no new growth except that put out as adventitious shoots and this year most of those were killed also.

Cryolite and barium fluosilicate successfully used in concentrated form.--S. F. Potts, New Haven, reports that, although cryolite and barium fluosilicate are relatively cheap insecticides, they have been considered unsatisfactory for the control of forest and shade tree pests because they will cause injury to tender foliage and because 0.25 inch of rain will remove from 95 to 98 percent of the deposit. However, the past season's work showed that an adhesive oil or casein could be incorporated in mixtures containing cryolite when triethanolamine is added to the water in the spray. When applied with special equipment, in the form of concentrated mixtures with adhesives, over half of the cryolite and barium fluosilicate remained after 6 weeks' weathering, during which period 5 inches of rain fell, and no plant injury resulted.

Papers submitted on insects attacking elm.--C. H. Hoffmann, of the Morristown, N. J., laboratory, has submitted two short papers for publication. One is entitled, "Additions to Annotated Lists of Insects Reared from Elm Bark and Wood." It lists 91 species, principally Coleoptera, Hymenoptera, and Diptera, and supplements 2 lists published by other authors. One of these lists, by L. L. Pechuman, appeared in Volume 32 of the Bulletin of the Brooklyn Entomological Society, and the other, by B. J. Kaston, appeared in Bulletin 408 of the Connecticut Agricultural Experiment Station. The need of ascertaining what insects breed in elm is important in connection with the Dutch elm disease eradication program, because of the actual or potential role they may play as carriers of the causative fungus. The other paper by Mr. Hoffmann is entitled, "Observations on the Biology of Saperda tridentata Oliv. and Magdalis armicollis Say." In the studies on which this paper is based special attention was given to the feeding and oviposition activities of these two species of Coleoptera that commonly attack elm, inasmuch as it was thought that through these activities they might serve as inoculation agents of the Dutch elm disease fungus.

Chemically treated elm trees examined.--R. R. Whitten, Morristown, has reported on the results of experiments conducted during 1938 in which living elm trees were treated with chemical solutions for the purpose of killing the trees and preventing subsequent bark beetle attack. Sample trees were selected in large field plots treated with copper sulphate solution by the Bureau's Dutch elm disease eradication unit. Some of these trees were treated in October 1937, others in May 1938, and the remainder in July 1938. The extent to which the trees had been killed by the treatment was noted and they were cut down, debarked, and examined for bark beetle attack. The trees were satisfactorily killed and over 98 percent of the bark area was found to be free of bark beetle galleries. Both species of elm bark beetles (Scolytus multistriatus and Hylurgopinus rufipes) were concerned in the very limited amount of attack found. In other field tests Mr. Whitten found ammonium bifluoride solution to be fully as satisfactory as copper sulphate solution in killing elm trees and preventing subsequent bark beetle attack. The ammonium bifluoride solution was applied while the trees were in leaf.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth scouting conditions range from ideal to impossible in November.--Excellent progress was made in gypsy moth scouting work during the first half of November, as scouting conditions were ideal; however, a heavy snowfall on November 25 temporarily halted the progress of the work. The heavy fall of snow rendered ground conditions ideal for burning brush, and most of the unskilled laborers were immediately employed on that phase of the control program.

Scouting work in swamps postponed.--Ordinarily there is a season during the summer or fall months during which swampy areas can be scouted. This year there was more than the normal amount of rain, and many swampy sections did not dry sufficiently to permit scouting. Many of these large areas cannot be scouted until they freeze.

United States and Canadian Governments cooperate in gypsy moth work.--Late in October two regular gypsy moth employees were temporarily detailed to special duty in Washington County, Maine. One of the men conferred with the Canadian official in immediate charge of gypsy moth scouting and treatment work in progress in the Canadian Province of New Brunswick, and completed arrangements for making joint observations in the section of Washington County adjacent to the Canadian border to determine the favorability of the woodland growth in that locality to gypsy moth development. As a result of these observations it was found that a very large percentage of the woodland growth in this territory is coniferous. Only five relatively small areas were discovered within which 50 percent of the growth consisted of favored food species. It is evident from these observations that the section of Washington County situated near Calais is not, as a whole, subject to severe infestation by the gypsy moth. While the survey was in progress the other Federal employee instructed the Canadian force in the proper use of ropes in tree climbing. Scouting was then begun at the sites of infestations discovered during the fiscal year 1938 in Princeton and Calais. Scouting in 20-foot strips will be continued until an area of at least 1/2 mile in radius around each infestation has been examined. The work in Princeton was completed late in November, and no gypsy moth infestations were discovered. Two small infestations have been found in Calais, where scouting work is still in progress.

Scouting in Vermont concentrated in Green Mountain section.--Many of the gypsy moth crews employed in northern Vermont were engaged, during the first part of November, in scouting the summits of the mountains along the Green Mountain Range, where spruce and northern hardwoods predominate.

Small gypsy moth infestations found in Vermont portion of barrier zone.--Two gypsy moth infestations totaling four egg clusters were discovered in the town of Goshen, and three single-egg-cluster infestations were found in Granville, up to the middle of November. Both of these towns are located in central Vermont, within and adjacent to the eastern border of the barrier zone. These are the first infestations to be found in the Vermont portion of the barrier zone since the Essex colony was eradicated during the fiscal year 1936. Evidently the presence of egg clusters in both towns was due to the windspread of small caterpillars from severe infestations existing in the White River Valley, to the east of the barrier zone.

Gypsy moth scouts protected during deer-hunting season.--With one exception, all Federal W. P. A. gypsy moth employees scouting in territory in Vermont where hunting is prevalent were removed from the woods during the open season on deer, from November 21 to 30, as a safety measure. They confined their work during this period to scouting in large strips of open country and in residential areas. The workers employed in the vicinity of Bolton, in northern Vermont, were assigned to duty during the latter part of November in a 3,000-acre tract of woodland which had not only been posted against hunting, but which was patrolled to prevent unlawful hunting in the area.

Instructive meeting held in Wilkes-Barre.--A meeting of the Pennsylvania Department of Forests and Waters and the Pennsylvania Department of Agriculture was held in Wilkes-Barre on the evening of October 25. A large number of members of the two departments was present, and had as guests representatives of the New York Conservation Department, the New Jersey Department of Agriculture, the Wild Life Association, and the Federal Bureau of Entomology and Plant Quarantine. Motion pictures of the damage done to forests when the gypsy moth becomes sufficiently abundant to defoliate tree growth were shown, and several speakers described the life history of the insect and the various types of work employed to control it. On the following day a trip was taken through a part of the gypsy moth infested territory, so that those present would have an opportunity to examine the work that had been done by the Federal Bureau in cooperation with the State of Pennsylvania, and to observe some of the field workers actually engaged in scouting and treatment work.

No infestation found outside of Pennsylvania quarantined area.--It was recently reported to the Federal gypsy moth office that gypsy moth egg clusters had been found outside of the Pennsylvania quarantined area on a farm in Eaton Township, Wyoming County. An investigation by Federal employees failed to disclose any evidence of the insect on the property. The person who made the report visited the property with the supervisor of the district, but was unable to locate any egg clusters, and the report is evidently baseless.

C. C. C. gypsy moth crews concentrate on ground work.--During the first half of November C. C. C. gypsy moth crews in Connecticut were chiefly engaged in doing ground and low work in the heavily infested Granby-Simsbury area. The men from the Westfield, Mass., camp were employed in piling and burning brush and forest debris that resulted from thinning work done earlier this year. C. C. C. crews in Vermont that normally would be used in gypsy moth scouting were still engaged in emergency work made necessary by the recent hurricane, and no gypsy moth work was done in that State during the first half of November.

Gypsy moth work reduced as C. C. C. repairs hurricane damage.--The C. C. C. is playing an important part in rehabilitating the forests damaged by the September hurricane. This emergency work is necessary in order to remove serious fire hazards and to open wood roads so that fire-fighting apparatus can reach isolated localities. Such work is being done at the expense of the regular work that had been planned. C. C. C. gypsy moth work has suffered greatly because of the emergency work, and less than half of the planned gypsy moth work was being performed as late as the middle of November.

Ground work in progress at heavy Connecticut infestation.--During the 3-month period from July 1 to October 1 new gypsy moth egg clusters treated by C. C. C. enrollees at the Granby-Simsbury infestation in Connecticut numbered 556,289. These clusters were deposited on ledges, rocks, stumps, and on the trees to a height of about 6 feet. Many more egg clusters that have not been treated are present on ground debris, logs, and cavitied trees which have been cut and gathered into piles for burning after snow covers the ground, and a large number of egg clusters remain higher up on the trees. Many of the trees containing heavy deposits of egg clusters will be climbed so that the higher egg clusters can be treated after snow puts a stop to the ground work. This method of concentrating on low work before snow falls, and later burning debris and creosoting egg clusters located higher up on the trees should result in the destruction of the greatest possible number of eggs before hatching time, thereby reducing the danger of windspread of small caterpillars from this exceptionally heavy infestation next spring. Approximately 90 C. C. C. enrollees were employed in the 76-acre area where work was in progress about the middle of November, but until that date considerably fewer men were available.

PLANT DISEASE CONTROL

Eradication crews encounter many species of barberry in Ohio.--In November more than 16,000 barberry bushes and seedlings were destroyed on 74 properties in Highland, Lake, Miami, Montgomery, Preble, Ross, Shelby, and Warren Counties in Ohio. Many of these were found in or near nurseries in Lake County where many different species of barberry bushes were grown some years ago. Among the infested properties cleared were 12 having *Berberis neuberti* and one having *B. sieboldi*. During the past year the following rust-susceptible species of barberry have been located in Ohio: *B. vulgaris*, *B. neuberti*, *B. ottawensis*, *B. vernae*, *B. wilsonae*, *B. sieboldi*, *B. diaphana*, *B. amurensis*, *B. aggregata*, *B. macrocarpa*, and *B. vulgaris atropurpurea*. Among the immune species encountered in the course of field operations were *B. thunbergii*, *B. mentorensis*, *B. circumserrata*, *B. julianae*, and *B. verruculosa*.

Intensive barberry survey completed in 42 counties in Indiana.--In analyzing the results of control work completed in Indiana in connection with the barberry-eradication program since emergency funds became available in 1933, Stanley Castell, State leader, finds that all uncultivated land in an area equivalent to 42 of the 92 counties in the State has been carefully inspected. In 11 counties that are representative of these 42 he finds that 64 percent of the area can now be considered relatively free of barberry bushes. The percentage of barberry-free territory in individual counties, however, ranges from 20 to 100. There are on record in Indiana 166 areas where barberry bushes have been found growing wild.

Identification of unusual physiologic races of rust leads to discovery of barberry bushes.--Recently physiologic races of *Puccinia graminis tritici* 65 and 147 were identified from rusted barley collected in Providence Township, Lac qui Parle County, Minn. Inasmuch as these races are unusual, L. W. Melander, leader in charge of barberry eradication in Minnesota, made an intensive search of this particular area with the result that a barberry bush about 7 feet in height and having a crown of about 2½ feet was found. He reports that there were still old aecial scars on many of the leaves. In addition to indicating the role isolated bushes may play in the production and establishment of new parasitic races, experiences of this kind point to the possibility that our annual physiologic race survey may have a practicable and valuable application in connection with our clean-up work in areas where barberry bushes are few and widely scattered.

Autogiro mapping of forest areas damaged by hurricane.--An experiment was conducted during the period October 27-29 to determine the practicability of using an autogiro in mapping areas of "blow-down" timber in the vicinity of Keene, N. H. It was possible to examine a total of 74,140 acres in 6½ hours of actual mapping time, and to record a total of 18,184 acres of blow-down timber. In order to compare aerial and ground mapping, the observer

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made a ground check of a representative block comprising 224 acres and containing 140 acres of felled timber. This ground work required 6 hours and the observer examined an average of 37 acres per hour. On the other hand, in the same length of time on the aerial survey he examined an average of 11,406 acres per hour. In other words, the aerial survey was 308 times faster than the ground work. The location, size, and shape of a few of the areas mapped from the air were checked by the ground survey. The results showed that the areas had been accurately located on the map and their size as determined from the autogiro was about 70 percent correct.

Accomplishments in blister rust control work in 1938.--The following table shows by regions the approximate results of blister rust control work during the calendar year 1938, up to and including October. The figures for "area worked" include the areas initially cleared of Ribes, as well as those that were reworked.

Region	Area worked	Ribes pulled	Labor	Ribes per acre
	Acres	Number	Man-days	Number
Northeastern----------	700,414	13,525,356	194,961	19.3
Southern Appalachian--	646,901	4,228,479	35,051	6.5
North Central---------	405,452	17,357,025	77,476	42.8
Northwestern----------	172,883	38,454,278	194,013	222.0
Sugar pine------------	137,228	23,008,940	159,205	167.7
Total-------------	2,062,878	96,574,078	660,706	--
Average-----------	--	--	--	46.8

Hurricane damage to white pine in New England.--E. C. Filler reports that, according to the best estimates available, a total of 2,263,244,000 board feet of white pine was blown down by the hurricane of September 21, 1938. The following table indicates the estimated amount of white pine timber blown down in each State and shows the counties in which most of the damage occurred.

State	Board feet of white pine blown down	County in which most damage occurred	Extent of damage (percentage of total)
	Thousands		
Connecticut----	175,000	Windham, Tolland	84
Maine----------	120,000	Oxford, Cumberland, York	98
Massachusetts--	628,225	Middlesex, Franklin, Worcester	70
New Hampshire--	1,222,509	Cheshire, Hillsboro, Merrimack, Sullivan	--
Rhode Island---	51,000	Kent (towns of Coventry and West Greenwich), Exeter (town of Washington)	--
Vermont--------	66,510	Orange, Windsor	70
Total------	2,263,244	--	--

Girl scouts aid in protecting white pines from blister rust.--In the summer of 1937 the Girl Scouts at the May Flather Girl Scout Camp located at Mt. Solon, Va., in the George Washington National Forest, began a conservation project and, through the assistance of G. C. Cramer, district blister rust leader, they learned to identify Ribes bushes and white pine, then were given actual training in eradicating these bushes to protect the pine. They took a keen interest in this work, and in the summer of 1938 they began Ribes eradication in earnest. During the season a total of 554 Ribes were pulled in 237 hours of work and 20 acres of ground covered in white pine areas. When one considers that these girls came from the city and were in many instances only 12 or 13 years old, and that the work was not always easy for them, their accomplishments take on added significance.

COTTON INSECT INVESTIGATIONS

Insecticide tests against pink bollworm.--In summarizing insecticide tests against the pink bollworm made at Presidio, Tex., during July and August, W. T. Hunt and O. T. Robertson report the percentage reduction in population with 10 of the insecticides used as follows:

Insecticide	Reduction in population
	Percent
Syncrolite 90%-celite 10%	75.7
Barium fluosilicate 90%-celite 10%	72.1
Alorco dusting cryolite	69.8
Alorco cryolite	65.2
Fixed nicotine	63.6
Dual fixed nicotine	59.4
Phenothiazine 20%-dolomite 60%-celite 20%	51.2
Paris green 10%-lime 40%-Kaolin 50%	36.5
Calcium arsenate 50%-sulphur 50%	30.4
Calcium arsenate	21.5

These insecticides were applied with hand dust guns, the applications being made, so far as possible, at 4-day intervals between 6 and 8 a.m., with two trips per row. In 1 experiment in which the first 4 materials on the list were used, the cotton was dusted 10 times. In the tests in which the other six materials were used, the plants were dusted six times. Syncrolite was the only material that was used in all three tests and in each instance it caused a greater reduction in the pink bollworm population than any of the other materials.

Cotton flea hopper control experiments.--There was a heavy infestation of the cotton flea hopper in southern Texas this year and conditions were favorable for insecticidal tests at the Port Lavaca, Tex., laboratory. K. P. Ewing and associates used 48 1-acre plots and 97 1/20-acre plots in their tests comparing sulphur, sulphur-arsenical mixtures, and other insecticides against the flea hopper. The infestations were determined by counting the flea hopper nymphs and adults in the terminal buds of the plants. In the 1-acre plots an average of 1,900 plants per plot were examined during the season May 30 to July 8. The maximum infestations in the check plots of the different experiments ranged from 61 to 201 flea hoppers per 100 terminal buds and occurred around June 15. The average seasonal infestation in the checks was 75.5 hoppers per 100 buds. The average gains from dusting were higher this year than ever before, the 36 dusted plots averaging 311 pounds of seed cotton, or 53 percent, gain, and $9.74 net profit per acre over the 12 checks. In one series (three replications) the average gain from sulphur was 243 pounds and $7.62 net profit; from a mixture of 20 percent calcium arsenate and sulphur, 256 pounds and $7.54; and from 33-1/3 percent calcium arsenate and sulphur, 305 pounds and $9.48 net profit per acre. Another series (three replications) gave an average gain of 294 pounds and $9.24 profit per acre from 20 percent calcium arsenate-sulphur, and 388 pounds and $12.71 profit from 33-1/3 percent calcium arsenate-sulphur. In a series (three replications) comparing different percentages of calcium arsenate and sulphur, the gains from the 20 percent calcium arsenate-sulphur were 294 pounds and $9.34 profit; from the 33-1/3 percent calcium arsenate-sulphur, 388 pounds and $12.79 profit; from the 50 percent calcium arsenate-sulphur, 405 pounds and $13.28 profit. The maximum gain from any of the treatments was 680 pounds (130.8 percent) and $25.11 profit per acre from a 50 percent calcium arsenate-sulphur mixture. The season's results showed definitely that mixtures of calcium arsenate and sulphur containing 33-1/3 or 50 percent calcium arsenate gave better and more economical control of the flea hopper than sulphur alone or a mixture containing only 20 percent calcium arsenate. Mixtures of paris green and sulphur containing 7½ percent and 10 percent paris green, respectively, also gave much better and more economical control of the flea hopper than sulphur alone. There was practically no difference, as shown from the infestation records, bloom counts, and yield records between these two mixtures of paris green and sulphur; nor was there any practical difference between the paris green-sulphur mixtures and the calcium arsenate-sulphur mixtures containing 33-1/3 percent and 50 percent calcium arsenate. In three experiments the average gain from sulphur alone was 334 pounds and $11.43; from 7½ percent paris green-sulphur, 450 pounds and $15.23; and from 10 percent paris green-sulphur, 463 pounds and $15.44. During the season the experiments received from three to five dust applications but some were washed off by rain, leaving from two to three effective applications with an average of 2.8. The average poundages of the different insecticides applied per acre at each application ranged from 13.35 to 14.79. The results in the 1/20-acre plots in latin squares were in line with those in the 1-acre plots, showing that the sulphur-arsenical mixtures gave better control than sulphur alone. In these tests a micronized sulphur, claimed to be 5,000 mesh and at least 95 percent pure, dusted at 7.5 pounds per acre gave practically the same gains as the ordinary 325-mesh dusting sulphur applied at 15 pounds per-acre application. A mixture of 20 percent cryolite and sulphur gave considerable control but apparently did not contain sufficient cryolite to equal the arsenical-sulphur mixtures. Barium fluosilicate, dusted at the rate of 7.5 pounds per acre, caused only a slight reduction in the flea hopper infestation and light burning of the plants, which reduced the yield in the dusted plots below that in the untreated plots.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection in all areas was discontinued at the close of November. During the month inspections were made mainly within the regulated area of the Texas Panhandle and bordering counties and in the Salt River Valley and Casa Grande-Coolidge area of Arizona. In the Panhandle additional specimens were found in counties already under regulation, but no new areas were involved. With the completion of inspection in the Salt River Valley a total of 116 specimens had been taken from gin-trash inspection. All pink bollworm findings during the month came from trash collected at the Gilbert Gin Co., Gilbert, Ariz. Separate samples of trash from individual farms were collected and examined. Results indicated that the infestation was concentrated in a small area east of Gilbert, with practically all the worms coming from one field--the Northroup farm. Field inspections will be made on adjoining and nearby premises to determine as nearly as possible the extent of the infestation. In Pinal County, Ariz., four specimens were taken from trash collected at gins located in the vicinity of Coolidge. Toward the end of November inspections were made at Yuma and Parker, with negative results. One crew operated at Mexicali, Lower California, practically all of the month. Conditions were extremely favorable during the period of inspection. Large amounts of trash were examined from over a wide area. There were no indications of pink bollworm infestation. Before inspection was terminated in Arizona a recheck was made in the Santa Cruz Valley and in the Safford Valley. A few additional worms were found at Safford, but the crew operating at Tucson was unable to make any further findings in the Santa Cruz Valley. During October 9 specimens were taken from gins in Pima and Santa Cruz Counties. The season's inspection in the Santa Cruz Valley indicated a rather sharp increase in Thurberia weevil infestation in the cultivated cotton. Weevils were found from cotton produced in fields from Calabasas to Marana, a distance of approximately 82 miles of Santa Cruz Valley land, containing 10,340 acres planted to short- and long-staple cotton.

Stalk destruction.--Personnel in the lower Rio Grande Valley continued to spend practically all their time during November in carrying out the stalk-destruction program. Three inspectors with cars spent their full time in Mexico. During the month 1,193 acres of stalks were plowed, leaving 602 acres to be taken care of. Of this amount, only 93 acres were still standing at the end of the month. Additional fields of soca cotton were located during the month, bringing the total acreage located to date to 2,855. Of this amount 2,184 acres have been plowed, 562 acres of which were plowed during the present month. Stalk destruction was the chief activity in the Coastal Bend area during November. Weather conditions hindered the work to some extent. It is estimated that of the 2,908 acres of cotton land not yet plowed there remains approximately 29 acres of original stalks that have not been cut, these acreages being located in Jim Wells County. These small acreages are of no menace at the present time, owing to cold weather during the latter part of the month. A light frost early in the month and a light freeze toward the end of November did considerable damage to cotton growth in the greater part of the Coastal Bend district. Seedling cotton was severely damaged. Stubble cotton, even though foliage was killed, has still sufficient life left that it will no doubt start growing when conditions become favorable.

Texas Panhandle district.--Weather conditions continued most favorable during November for the continued harvesting of the cotton crop. This fall has perhaps been the most favorable with reference to weather conditions in the history of cotton production in the area. Cotton pickers migrated to the area early in the season and remained in sufficient numbers to cause the crop to be gathered very rapidly. With such favorable picking and ginning conditions, it was possible to give the area a very thorough gin-trash inspection. Findings made in the regulated counties were as follows: Midland County, 16 specimens; Howard, 2; Andrews, 6; Dawson, 4; Gaines, 1; Terry, 1; Cochran, 2; and Lamb, 1. These findings indicated a general but light infestation over the entire district. During the month three road patrols operated to check trucks moving cottonseed to designated mills and to prevent the illegal movement of said cotton and cottonseed out of the area. A road patrol was established at a point leading out of the district on State Highway No. 9 to check cotton pickers departing from the area. During the period November 12-30 a total of 1,008 pickers was inspected and 3,967.5 pounds of seed cotton and 43 pounds of cottonseed were intercepted and burned.

Big Bend area.--Clean-up was completed on November 12, with approximately 3,000 acres of cultivated cotton and about 800 acres of soca being cleaned. A very good clean-up of cotton fields on the Mexican side of the river was accomplished. The Mexican inspector did an excellent job, and practically all fields were completed during the month. The month of November was unusually cold. The temperature dropped to 18° above zero at Presidio for several days early in the month, which no doubt killed a considerable number of pink bollworms. An inspection of nine fields in the Pilares section showed that 80 percent of the worms had been killed by the cold weather. An inspection trip was made to Casa Piedra during the month and it was found that out of 11 worms 8 had been killed apparently by the cold weather.

Wild-cotton eradication.--During the first part of the month the number of W. P. A. workers was increased from 75 to 90. In addition to the areas covered last month, work was also begun in the Biscayne Bay Keys, Lower Matecumbe, and Ten Thousand Islands section. During the month approximately 68,000 wild cotton plants were destroyed, of which 101 had matured fruit. One new colony was located in Hillsborough County. From this colony, 15 plants were removed, of which 2 had matured fruit. A total of 199 domestic plants were removed from railroad rights-of-way in Hillsborough County.

Thurberia-plant eradication.--During the month of November 19,470 Thurberia plants were located and destroyed over 1,920 acres of extremely rough territory. It was necessary to build 9 miles of trail over the mountain to get in camp equipment and supplies, as well as repair 3 miles of trail to make it safe for trucks to pass over. For the next 3 months in order to get camps in strategic locations it means constantly moving camps for short periods. This is the only way the plant colonies can be reached without the men spending too much time in walking to and from work. Practically all Thurberia plants destroyed throughout the month have been infested with weevils in all stages.

Fumigation experiments with methyl bromide against the cigarette beetle.--W. D. Reed and J. P. Vinzant, of the Richmond, Va., laboratory, report that dosages of 5 and 6 pounds of methyl bromide per 1,000 cubic feet were effective in killing full-grown larvae of Lasioderma serricorne (F.) in experiments in the fumigation of baled Turkish tobacco at reduced pressures under summer conditions of high temperature, at an exposure of 4 hours. The mortality of the test larvae was 100 percent for all lots which were given a 44-hour period of post-fumigation and virtually 100 percent for all lots of test insects which were removed from the tobacco bales at the expiration of the 4-hour exposure period. When the fumigated tobacco received three air washes before being removed from the fumigation tank, the mortality of test larvae placed in the bales of tobacco after its removal to storage quarters was much reduced, as compared with that attained in the tobacco receiving one air wash. These results indicate that a sufficient concentration of methyl bromide is retained for some time in the fumigated tobacco to effect a high mortality of cigarette beetle larvae. Chemical tests with a leak detector indicated that a concentration of 500 parts per million of methyl bromide was present near the stacked bales of fumigated tobacco in the fumigation tanks during the process of unloading. In one experiment a concentration of 1,460 parts per million was built up from the treated tobacco stored in a gas-tight room for 17 hours. Additional chemical tests were performed which showed that appreciable concentration of methyl bromide is retained in tobacco by absorption and that satisfactory aeration would have to be devised for the use of this gas in tobacco factories and warehouses.

FOREIGN PLANT QUARANTINES

Fruitfly in allspice.--Living larvae and pupae of the Mediterranean fruitfly (Ceratitis capitata Wied.) were intercepted at New York on October 20, 1938, in and among allspice (Pimenta officinalis) berries in baggage from Bermuda. The berries were so heavily infested that the contents of the container were a miscellaneous jumble of larvae, which had crawled out of the host, and pupae, which had formed outside of it. This represents a new host record for the files in this office. The interception was made by Inspector O. G. Fitzgerald.

Life along the Border.--Notebooks of Mexican border inspectors tell of a home-cooked basket dinner carried by a motherly lady who had "no fruit or plants." A big roast chicken fitting closely in the top of a deep casserole and looking especially appetizing was found to conceal ten large whole avocados. A woman pedestrian kept up a monotonous refrain of, "I don't have any fruit," as the inspector examined her numerous packages, until he found three whole avocados in the dressed goat in the largest parcel. Four elderly ladies unable to eat all of their pears gave the remaining two to the inspector saying they were too good to throw away. One pear contained three fruitfly larvae (Anastrepha sp.). Examination of a small parcel en route from Mexico to Tanganyika, Africa, disclosed that it contained 11 Inga pods in which were 36 larvae of Anastrepha distincta Greene, as well as a few other insects. A bulging hip pocket yielded two guavas from a Mexican who had "no fruit" and his loud voluntary protestations that a woman passenger on the same bus had no fruit led to a careful search until a guava was found in her purse, which might not have been opened otherwise. It was disclosed that the couple were man and wife, therefore the husband had two fines to pay, while the inspector mentally recalled the Mexican proverb, "The closed mouth catches no flies." A corpulent lady in an air-conditioned car perspired so freely when questioned regarding plant material that the inspector's suspicions were aroused, but he was unable to find any contraband in her hand baggage. Later she became greatly agitated again when her trunk was to be inspected, although still maintaining she had no contraband. Under a false bottom in the trunk were five tropical plants. One lady tourist had to be asked to get out of a car being inspected. A large quince rolled off the seat when she got up. Although all passengers declared they had "no fruit," four guavas were found hidden in a bag of clothing. One guava contained eight larvae of *Anastrepha* sp. and the quince contained 3 such larvae.

Entomological interceptions of interest.--Seven living larvae of the trypetid *Anastrepha mombinpraeoptans* Sein were intercepted at the airport in Puerto Rico on May 21, 1938, in a mango in express from the Dominican Republic. Twenty larvae, living and dead, of the Mediterranean fruitfly (*Ceratitis capitata* Wied.) were intercepted at New York on August 26, 1938, in seven dates (*Phoenix dactylifera*) in baggage from Bermuda. A living adult of the cucujid *Laemophloeus iteratus* Sharp was taken at New Orleans on June 17, 1938, under the bark of a mahogany log in cargo from Panama. Living specimens of the whitefly *Neomaskellia bergi* (Sign.) were collected on January 14, 1938, on sugarcane leaves in the field at Mata, Guam. Two dead larvae of the Asiatic rice borer (*Chilo simplex* Butler) arrived at Chicago, Ill., on July 5, 1938, in rice-straw packing in the mail from India. A living adult of the weevil *Leiosoma oblongulum* Boh. was found at Washington, D. C., on June 6, 1938, in soil around primrose plants in the mail from England. Living specimens of the scale insect *Chrysomphalus nigropunctatus* Ckll. were intercepted at San Francisco on June 27, 1938, on a plant of *Echeveria marginata* in the mail from Mexico. Two living adults of the bruchid *Acanthoscelides flexicaulis* (Schaeffr.) were taken at Hidalgo, Tex., on September 5, 1938, in ebony beans (*Caesalpinia* sp.) in baggage from Mexico. Two living specimens of the olethreutid *Ofatulena duodecemstriata* (Wlsm.) arrived at Brownsville, Tex., on July 7, 1938, in mesquite beans in baggage from Mexico. A living adult of the weevil *Calendra pertinax* Oliv. was found at El Paso, Tex., on July 31, 1938, in a pear fruit in baggage from Mexico. The pink bollworm (*Pectinophora gossypiella* Saund.) was intercepted at Miami, Fla., on April 29, 1938, in cottonseed in baggage from the Bahamas. The two pounds of cottonseed were used as stuffing in a pillow.

Pathological interceptions of interest.--*Aphelenchoides demani* Goodey, *Ditylenchus dipsaci* (Kuhn) Filipjev, and *Pratylenchus pratensis* (de Man) Filipjev were intercepted at New York on November 21 on lily-of-the-valley pips from Holland. *A. hodsoni* Goodey was intercepted in a narcissus bulb in baggage from Europe (country of origin not known) on October 23 at New York. *Cryptostictis* sp. (no species reported on host) was found on *Brabejum stellatifolium* in special permit material from New Zealand at San Francisco on September 8. *Diplodia henriquesiana* Trav. and Spessa. was intercepted on orchids from Venezuela August 24 at Washington. *Discosia pini* Heald was intercepted on *Pinus strobus* cones from Germany at New York on November 15. *Ditylenchus dipsaci* (Kuhn) Filipjev and *Sclerotium semen* Tode were found in *Iris angelica* from Holland on October 5 at Washington, D. C., *Gymnosporangium haraeanum* Syd. was found on juniper foliage from Japan in ship's quarters on

February 21, 1938, at Seattle. This species is listed in Stevenson's manual as G. koreaense. Leptothyrium pomi (Mont. & Fr.) Sacc. was intercepted on jobo from Barbados on November 7 at Boston. Pestalozzia neglecta Thum. was intercepted on November 8 at Seattle on Euonymus radicans from Japan. Pestalozzia sp. (no species reported on the host) was intercepted on Brabejum stellatifolium from New Zealand on September 8 at San Francisco. Phoma iridina Maire and Sacc. was intercepted on iris roots from France on August 23 at Washington. Physopella fici (Cast.) Arth. was intercepted on fig leaves in baggage from Cuba on October 3 at Miami. Puccinia coronata Cda. was intercepted on Arrhenantherum elatius var. bulbosum leaves in cargo from Germany on October 25 at New York. Septoria azaleae Vogl. seems to have been more abundant than usual this year, having been intercepted at Washington in October and early in November on azaleas under five permits from Holland and under two from Belgium.

DOMESTIC PLANT QUARANTINES

Grasshopper survey completed.--Grasshopper infestations in 1939 will be less severe than those of 1938, according to indications of the recent survey of grasshopper eggs throughout the region from the Mississippi Valley to the Pacific coast. In most of that region the control operations of the past season reduced the potential danger of grasshopper outbreaks in 1939, the reductions shown by egg counts ranging from one-third to two-thirds in Wisconsin, Iowa, Missouri, Kansas, and Oklahoma. The survey made in the fall of last year indicated a need of 178,000 tons of mixed bait. The accuracy of the 1937 survey was evidenced in the 1938 season in different States where normal hatching occurred, and it is now generally conceded that the potential infestation as indicated by the survey was remarkably accurate.

Results of grasshopper poisoning in 1938.--Grasshoppers were profitably and satisfactorily controlled in the 24 Western States in which baiting operations were carried on the past field season through Federal-State activities. In the region from the Mississippi Valley to the Pacific coast, it is estimated that, for each dollar invested in the purchase and mixing of bait materials, approximately $79 was saved through the application of poison bait. More than 400,000 farmers used approximately 155,000 tons of mixed bait on about 30,000,000 acres of land and this afforded protection for more than 55,000,000 acres of crops. The estimated savings for 1937 were $102,288,000, or $51 for each dollar spent for bait. The estimated losses for 1937 were $65,800,000.

Migratory hoppers present special problem.--More effective results were obtained this year in control operations in regions where the different kinds of hoppers which destroy crops did not show marked tendencies to migrate long distances by flight. Also, in areas where the migratory species developed, there was a high degree of control which prevented much flight and resulted in substantial savings of crops. Where the available man power was sufficient to bait the hatching places before the young hoppers migrated into crops, and where there was a good organization to fully utilize community efforts, the losses were reduced to a minimum. In all States, however, there were some losses because many farmers simply will not use bait until they have visible evidence of damage to their crops. The larger portion of the estimated loss of $87,000,000 occurred principally in the northern Great Plains area, where eggs of the migratory Melanoplus mexicanus Sauss. hatched in numbers ranging from 1,000 to 10,000 per square yard on idle and abandoned agricultural land. Hatching was prolonged by periods of cool weather, necessitating repeated applications of bait. In parts of this area farm population does not exceed two or three families per township and it is impossible for the available man power to bait the extensive hatching places. The situation resulted last July in the largest flight in recent history into 15 counties in eastern Montana, 3 in Wyoming, some scattered counties in North Dakota and South Dakota, and in areas along the Red River Valley in North Dakota and Minnesota. These flights discouraged farmers from further baiting in areas where good control had already been effected but which was nullified by incoming hordes from other sections.

Conference on grasshopper control.--A conference of Federal and State plant-pest-control officials was held at Omaha on November 21 and 22, attended by representatives of the Bureau and of 17 Western States. The results of the grasshopper-control operations of the 1938 season were presented, fall survey of grasshopper eggs reported on, and the potential needs of 1939 discussed.

Extent of Mormon cricket control in 1938.--The crop acreages protected from Mormon cricket damage in the 10 States in which cooperative Federal-State control operations were carried on total 1,375,000 acres. Such control is evidenced by the fact that, although 14½ million acres were known to be infested in Colorado, Idaho, Montana, Nebraska, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming, less than 13,000 acres of crops were destroyed. These losses occurred almost entirely in isolated areas where cooperative control could not be well organized. In one of the older infested areas the control operations resulted in apparent eradication of the crickets, and in several other areas cricket populations were so reduced as to indicate possibilities of eradication. Chief dependence in control measures was placed on the application of sodium arsenite dust mixed with diatomaceous earth or hydrated lime, at the rate of 5 pounds of the mixed dust per acre, applied with either hand or power dusters. The dusting operations were supplemented by the use of metal barriers and pen traps, by oil-on-water barriers, and by trench barriers. Approximately one-third of the cost was provided by the States, counties, communities, and individuals, and two-thirds by this Bureau.

Mormon cricket survey.--Surveys conducted in the current fall by Federal supervisors in all areas known to be infested with Mormon crickets indicate that infestations exist on nearly 19 million acres of land in the 10 States (except Colorado) in which control operations were conducted last season, and also in Nebraska. The estimate for 1937 was 14,165,000 acres. The seeming increase is due mainly to the fact that records are not available for 1937 infestations in Nebraska and the Dakotas and that the 1938 survey is more complete.

White-fringed beetle control.--Activities in November consisted principally of regulatory work with a force of 23 Federal inspectors, 15 of whom devoted full time to this phase of the work, and 11 State inspectors, of whom 7 gave full time. The commodities checked for quarantine compliance consisted principally of forest-plant products, farm-tenant equipment, and farm produce, including peanuts, of which a record crop of 3¼ million pounds was marketed at Florala, Ala. Few violations of the quarantines were observed throughout the regulated areas. Some roadside interceptions were made, however, of such materials as hay and building materials. In the New Orleans area 14 Federal and State inspectors are conducting regulatory work in order to give prompt attention to the movement of nursery stock and other restricted articles from nurseries and stores. Soil sterilization is supervised and only plants that are potted in sterilized soil may be moved to points outside the regulated areas. Nurserymen are cooperating well in this work. The commodities for which permits have been issued since July 1, are, in order of importance: Forest products, nursery stock, and cotton products. On the control phase of the project, the November work consisted principally of the removal of brush to clear the way for subsequent control operations and the cutting and burning of vegetation, with the labor assistance of State-sponsored W. P. A. crews. Adult beetles had practically disappeared the first week in November and no beetles were collected in the traps at Laurel, Miss., after November 22.

Calcium arsenate effective in checking white-fringed beetle infestations.--To further check the results of applications of calcium arsenate, a count was recently made at a known infested nursery of larvae in the soil dug to a depth of 8 inches and sifted. Two larvae to the square yard were found in soil that had been so treated, as compared with 49 in untreated soil. The two properties had been about equally infested with adult beetles. At another point the counts ran from 0 to 12 per square yard on dusted properties and from 49 to 90 on those not dusted.

Sweetpotato weevil control activities.--Surveys for sweetpotato weevils were made along with the eradication work in November, cooperatively with the States. Such inspection of the volunteer sweetpotato plants and of fields after harvest resulted in the location of several infestations, principally in Texas, including infestations in the three counties recently added to the eradication areas. All infested properties are being cleaned and fields replowed. Killing frosts occurring over the eradication areas of the various States the latter part of November are helping to rid the fields of left-over host plants. The inspection of approximately 17,500 bushels of sweetpotatoes in commercial storage houses at two points in Texas resulted in finding no weevils. Formerly infested properties in Lawrence County, Miss., were inspected without finding any weevils in that county. Further checks will be made to determine whether the infestations may have been eradicated. From July 1 to November 30, infestations have been found as follows:

State	Counties infested	Properties infested
	Number	Number
Alabama	2	165
Georgia	2	15
Mississippi	8	127
Texas	7	328

Eighteen Federal and 28 State inspectors were employed on the work in November.

Peach-tree-removal work speeded up.--With the assistance of an increased force of relief employees averaging 890 in November and with the completion of the seasonal inspection work, all activities of the peach mosaic and phony peach project were concentrated on the removal of diseased, abandoned, and escaped peach trees in 10 States. An increased number of waivers was obtained during the month for the removal of such trees in the mosaic-infected districts of California, and good progress is being made in that work. State-hired tractors are being used in those areas where practicable. In the period from July 1 to October 31 nearly 84,000 diseased trees and over 500,000 abandoned and escaped peach trees had been removed from the various infected States.

All phony trees removed from Georgia.--Nearly 77,000 peach trees were found infected with the phony peach disease in Georgia in the season of 1938. The removal of all these trees--as well as those found infected in 1937, which was completed on November 19--represents a marked advance in control of the disease in t is heavily infected area. Work is now in progress on the abandoned and escaped trees in 18 counties of that State.

Transit-inspection force increased for Christmas shipping.--Nine inspectors from the gypsy moth control project are being assigned to transit inspection at northeastern points during the Christmas shipping season for the inspection of truck movement of Christmas trees, of wholesale flower markets at New York City, and of restricted materials moved to the Worlds Fair Grounds, and also to assist regular transit inspectors in checking mail, express, and freight.

Transportation employees cooperate in quarantine observance.--Express employees at one of the large railway centers of the Northeastern States are, according to the transit inspector in charge, of vital assistance to the project in making a practice of inquiring thoroughly as to contents of all shipments likely to contain restricted materials and insisting upon certification when such is required. Instances were noted of the refusal of floral wreaths containing uncertified laurel and hemlock from the gypsy moth area, and of burlap bags containing marble chips from the same area. Freight foremen and car checkers handling the transfer of shipments are equally efficient in holding up any uncertified consignments and reporting them through regular channels to the agent of the receiving station, who is requested by superior officers to explain the acceptance of the shipment. Freight transportation companies continue to report to transit inspectors information as to shipments of nursery stock over their lines. One of the important freight yards in the Chicago district, covering an area 5 miles long and half a mile wide, was recently equipped for electric operation and has thereby speeded up activities to the point where 10,000 cars pass through the yards every 24 hours.

Recent interceptions.--The inspection of shipments in transit at 14 important railway centers, for compliance with domestic Federal plant quarantines, resulted in finding in November 223 apparent infringements in shipments consigned to 34 States, the District of Columbia, and Canada. Uncertified materials were found in containers bearing the labels "Greenhouse-grown - No inspection required" and "Inspection tag attached." Information provided as to observations of shipments of ant colonies in soil and of small wooden reels led to the investigation of such shipments and the application of certification and permit provisions.

Nurseryman fined for shipping Ribes without permit.--A fine of $100 was recently imposed in the case of a midwestern nurseryman who was found guilty on four counts in failing to obtain control-area permits in shipping currant and gooseberry plants to certain other States which maintain areas free from these plants.

Citrus canker eradication.--Eighteen Federal and State inspectors and 200 W. P. A. workers are employed at present on citrus canker inspection and eradication in Texas, working principally in the Houston area. The removal of some abandoned nursery and dooryard trees in other parts of the State was begun in November. In the four infected counties of Texas--Brazoria, Galveston, Harris, and Jefferson--there are 22 nurseries that have 87,265 citrus trees to be sold locally. These nurseries are given rigid inspections just before the shipping season. Other citrus trees in the infected area total 112,156 on 3,495 properties, of which 37,677 are Citrus trifoliata in a few hedges and the remainder principally satsumas and kumquats, which are resistant to canker. The repeated use of flame throwers and chemical solutions on all formerly infected properties is reducing citrus canker. Only one new case, and that in an old area, and three recurrent cases have been found thus far in 1938.

CONTROL INVESTIGATIONS

Pyrethrum evaluation.--M. S. Lowman, of the Bureau of Plant Industry, and W. N. Sullivan of this Bureau, reported (Soap, vol. 14, no. 14: pp. 89-93, 119) on the relation of pyrethrin content of pyrethrum flowers to their toxicity to mosquito larvae. The correlation between toxicity and the percentage of Pyrethrin I and the correlation between toxicity and total pyrethrins were found to be about equal, except in samples with unusually high or low proportions of Pyrethrin I. One test in duplicate against the larvae was found to be sufficiently accurate to indicate samples of high or low toxicity, and for this purpose the method has been found to be of value in handling the large number of samples involved in developing strains of high pyrethrin content.

INSECTICIDE INVESTIGATIONS

Relation between chemical constitution and toxicity of organic compounds.--This subject, which has engaged the attention of many biologists, pharmacologists, and chemists, has been studied by W. A. Gersdorff, of this Division, using the goldfish as the test organism. It was found that when the oxygen in cresol is replaced by sulphur, the toxicity is greatly enhanced. The para compound is more toxic than the meta and this in turn is more toxic than the ortho. Para-tolyl mercaptan is about eight and a half times as toxic to the goldfish as phenol. A report of this work is published in Protoplasma (vol. 31, no. 2, pp. 199-206. 1938).

Stability of derris deposits.--R. D. Chisholm and L. D. Goodhue, working at the Japanese beetle laboratory, Moorestown, N J., have recently reported (Soap, vol. 14, no. 12, pp. 117, 119, 131, December 1938) a method for studying the effect of rain and sunlight upon derris deposits under laboratory conditions. Exposure to a mercury vapor arc for 8 hours causes about the same percentage of decomposition in a derris deposit as does exposure to sunlight for 5 days.

Review of literature on derris and cube.--The Division of Insecticide Investigations has recently issued two mimeographed publications, E-453 and E-457, reviewing recent literature on Lonchocarpus and popular articles on derris, respectively. The interest in these rotenone-bearing plants is indicated by the 480 references to cube, most of which were published during the last 3 years.

BEE CULTURE

Fungus attacking queen larvae and sealed cells.--In recent queen-rearing work at the Southern States bee culture laboratory, Baton Rouge, La., at least one of each lot of cells placed in an incubator after the cells were sealed was found to contain a dead larva attacked by a fungus. C. E. Burnside, of the Beltsville, Md., laboratory, identified this fungus as *Aspergillus niger*. He states, "There seem to be no published reports of *A. niger* attacking queen larvae in sealed cells."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Taxonomic study in connection with the Mormon cricket problem.--A large collection of the Mormon cricket and allied species was recently received for study and identification from the Division of Domestic Plant Quarantines. It comprised 59 lots preserved in a 4-percent solution of formaldehyde and contained an estimated total of nearly 4,000 specimens, from North Dakota, South Dakota, Nebraska, Montana, Wyoming, Idaho, Utah, Washington, Oregon, and Nevada. This probably represents the finest assemblage of such material ever made available for taxonomic study. Only preliminary examination has been possible thus far, but this shows the following species, as tentatively identified, to be present: *Anabrus simplex* Haldeman, *Anabrus cerciata* Caudell, *Anabrus longipes* Caudell, *Anabrus spokan* Rehn and Hebard, *Peranabrus scabricollis* (Thomas), *Apote* sp., *Pediodectes stevensonii* (Thomas), *Pediodectes haldemanii* (Girard), *Pediodectes nigromarginata* (Caudell), and *Steiroxys* sp. As was expected, the Mormon cricket (*A. simplex*) was much more abundantly represented than any of the others, specimens being present in 48 of the 59 lots. There are a number of perplexing taxonomic problems involved in a study of this group, for specific and varietal limits have not been at all satisfactorily determined. However, it is hoped that a rather detailed report can be made available to field workers for the 1939 season, including identification keys to the genera and species, illustration of taxonomic characters, discussion of features most valuable in field recognition, and certain other information, with an indication also of situations from which further material is needed.

Distribution records for an injurious leafhopper.--The discovery of specimens of *Cicadulina bipunctella* (Matsumura) [synonym: *Cicadulina zeae* China] among material collected in Guam in May 1936 by O. H. Swezey and R. L. Usinger, led to further inquiry concerning the distribution of this interesting African species. Zachwatkin, in 1935, recorded its occurrence in Yemen, Arabia, and this appears to be the only published record of its occurrence outside of Africa; however, the National Museum Collection contains specimens from Japan and the Philippine Islands. *C. bipunctella* is of particular interest because it has been recorded, under the name *C. zeae* China, as being injurious to maize in Kenya Colony, Africa. The closely related species C. mbila (Naudé) is recorded as transmitting streak disease of maize in Natal, and C. arachidis China and C. similis China are injurious to "ground nuts" in the Gambia, and suspected of transmitting the virus of the rosette disease of that plant. No species of the genus, other than bipunctella, is known to occur outside of Africa. The Guam specimens of bipunctella were from corn and grass, but in the Japanese, Philippine, and Yemen records no information concerning hosts was available.

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